

IN THE CLAIMS:

1. (Currently amended) A device, for providing displacement or velocity
2 information, said device comprising a housing holding a sensor, said sensor
3 including a coil and a captive core, wherein an electrical measurement of said coil
4 provides information about at least one from the group including displacement of
5 said captive core or and velocity of said captive core, further wherein said coil has
6 an axis extending in a first direction, wherein said housing has a minimum outside
7 dimension that is less than 3.00 mm when measured perpendicular to said first
8 direction, wherein said housing further comprises a support for said captive core,
9 wherein resistance to lateral force provided by said support is independent of
10 displacement of said core.
1. 2. (Original) A device as recited in claim 1, wherein said housing has a minimum
2 outside dimension that is less than 2.50 mm when measured perpendicular to said
3 first direction.
1. 3. (Original) A device as recited in claim 1, wherein said housing has a minimum
2 outside dimension that is less than 2.00 mm when measured perpendicular to said
3 first direction.
1. 4. (Original) A device as recited in claim 1, wherein said housing has a minimum
2 outside dimension that is less than 1.80 mm when measured perpendicular to said
3 first direction.
1. 5. (Original) A device as recited in claim 1, wherein said housing has a minimum
2 outside dimension that is less than 1.60 mm when measured perpendicular to said
3 first direction.
1. 6. (Original) A device as recited in claim 1, wherein said housing has a minimum
2 outside dimension that is less than 1.40 mm when measured perpendicular to said
3 first direction.
1. 7. (Original) A device as recited in claim 1, wherein said captive core extends into
2 said coil.
1. 8. (Currently amended) A device as recited in claim 1, wherein said captive core has
2 a first portion having a first diameter, wherein said captive core further includes a
3 second portion having a diameter greater than said first diameter for retaining said
4 core within said housing, and wherein said captured captive core is supported in
5 said housing by a first bearing and by a second bearing.

- 1 9. (Original) A device as recited in claim 8, wherein said first bearing is connected to
2 said housing, wherein said core slides within a hole in said first bearing.

1 10. (Currently amended) A device as recited in claim 8, wherein said second bearing
2 is mechanically mounted to at least one from the group including said coil or to
3 and said housing, wherein said core slides within a first hole in said first bearing
4 and wherein said core slides within a second hole in said second bearing, wherein
5 said core extends out from said housing from said first bearing to provide said
6 resistance to lateral forces on said core where it said core extends from said
7 housing while allowing free axial movement of said core.

1 11. (Original) A device as recited in claim 8, wherein said second bearing is integral
2 with said second portion and mechanically connected to said core, wherein said
3 second bearing moves with said core.

1 12. (Original) A device as recited in claim 11, wherein said first bearing and said
2 second bearing are jewel bearings.

1 13. (Original) A device as recited in claim 11, wherein said captive core comprises
2 steel, stainless steel, titanium, aluminum, plastic, or a super-elastic material.

1 14. An sensor as recited in claim 13, wherein said superelastic material comprises
2 nitinol.

1 15. (Original) A device as recited in claim 1, wherein said displacement or velocity
2 sensor comprises an inductive sensor or an eddy current sensor.

1 16. (Original) A device as recited in claim 15, wherein said inductive sensor or said
2 eddy current sensor is a one-coil device.

1 17. (Original) A device as recited in claim 15, wherein said inductive sensor or said
2 eddy current sensor is a two-coil device.

1 18. (Original) A device as recited in claim 15, wherein said inductive sensor or said
2 eddy current sensor is a three-coil device.

1 19. (Original) A device as recited in claim 1, wherein said sensor further comprises a
2 spring to provide a return force to said core.

- 1 20. (Original) A device as recited in claim 19, wherein said core extends through said
2 spring and into said coil.

1 21. (Original) A device as recited in claim 1, wherein said core includes a
2 ferromagnetic material.

1 22. (Original) A device as recited in claim 21, wherein said ferromagnetic portion
2 comprises iron, nickel, ferrite, or steel.

1 23. (Original) A device as recited in claim 1, wherein said core further comprises a
2 contact point for making contact with an object to be measured, wherein said
3 contact point is made of a hard material that resists wear.

1 24. (Original) A device as recited in claim 23, wherein said hard material comprises
2 alumina, ruby, sapphire or hardened steel.

1 25. (Currently amended) A device as recited in claim + 19, wherein said core further
2 comprises a core stop to capture said core within said housing, wherein said core
3 stop further limits extension of said spring.

1 26. (Currently amended) A device as recited in claim + 25, wherein said housing has
2 an inside diameter, and wherein said core stop is sized to have an outside diameter
3 approximately equal to said inside diameter to provide a bearing function for
4 guiding said core.

1 27. (Original) A device as recited in claim 1, further comprising lead wires
2 electrically connected to said coil and extending to a circuit.

- 1 28. (Currently amended) A device for providing displacement information,
2 comprising a housing, having an inner surface within said ~~having~~ a housing, said
3 inner surface having an inner-surface-inside dimension, said housing for holding a
4 displacement sensor and a guidance mechanism, said displacement sensor
5 including a coil and a captive core, said captive core having a core-outside
6 dimension, wherein said guidance mechanism comprises a first bearing and a second
7 bearing for guiding said core, wherein said first bearing is connected to
8 said housing, wherein said first bearing has an axial hole having an axial-hole
9 dimension about equal to said core-outside dimension, wherein said core slidably
10 extends through said axial hole, wherein said second bearing has a second-
11 bearing-outside dimension about equal to said ~~housing-~~ inner-surface-inside
12 dimension, wherein said guidance mechanism is for resisting lateral movement
13 and lateral rotation of said core while allowing axial movement of said core into
14 and out of said coil, wherein said inner-surface-inside dimension is greater than
15 inside diameter of said coil, wherein said captive core has a stroke length, wherein
16 said captive core has a first length of contact with said first bearing, wherein said
17 captive core has a second length of contact with said second bearing, wherein said
18 first length of contact is less than said stroke length and wherein said second
19 length of contact is less than said stroke length.

1 29. (Original) A device as recited in claim 28, wherein said second bearing is
2 connected to said captive core.

1 30. (Original) A device as recited in claim 28, wherein said second bearing is
2 connected to said housing or connected to said coil.

1 31. (Currently amended) A device as recited in claim 28, wherein said second bearing
2 includes is connected to said coil.

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1 33. (Original) A device as recited in claim 28, wherein said coil has an axis extending
2 in a first direction, wherein said housing has a housing outside dimension,
3 wherein said housing has a minimum outside dimension that is less than 3.00 mm
4 when measured perpendicular to said first direction.

1 34. (Original) A device as recited in claim 28, further comprising a spring for spring
2 loading said core.

- 1 35. A system for providing displacement or velocity information, comprising an array
2 of displacement sensors capable of providing displacement or velocity
3 measurements, wherein said displacement or velocity measurements are on center
4 to center spacing of less than 3mm.
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- 6 36. (New) A device as recited in claim 10, wherein said core extends out from said
7 housing from said first bearing, wherein said second bearing is spaced a distance
8 from said first bearing to provide said resistance to lateral forces on said core
9 where it said core extends from said housing while allowing free axial movement
10 of said core